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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/523,659	02/04/2005	Christopher N. Bowman	76775.011307	1198
37705 7590 11/29/2007 GREENBERG TRAURIG, LLP 1200 SEVENTEENTH STREET, SUITE 2400 DENVER, CO 80202			EXAMINER BERMAN, SUSAN W	
			ART UNIT 1796	PAPER NUMBER
			MAIL DATE 11/29/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/523,659

Applicant(s)

BOWMAN ET AL.

Examiner

/Susan W. Berman/

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-11,20,21 and 25-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-11,20,21 and 25-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 February 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

Response to Amendment

The objection to claims 4-8, 12-19 and 22-24 under 37 CFR 1.75(c) as being in improper form is withdrawn.

Response to Arguments

Applicant's arguments filed 09-14-2007 have been fully considered but they are not persuasive.

The Declaration of Christopher N. Bowman under 37 CFR 1.131 filed 09-14-2007 has been considered and found unpersuasive of reduction to practice before the Liew et al article "Fabrication of SiCN MEMS by Photopolymerization of Pre-ceramic Polymer" for the following reasons. It is agreed that the data on pages 1-2 of the lab notebook submitted shows photopolymerization of Ceraset™ in the presence of a photoinitiator. However, there is no evidence noted of pyrolyzing at 1000⁰C in a nitrogen atmosphere to obtain a ceramic, as taught by Liew et al on page 121 in "2. Fabrication process" and set forth in instant claim 20.

Claim Rejections - 35 USC § 103(a)

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lutz et al (4,816,497). Lutz et al disclose infusible preceramic silazane polymers obtained via UV radiation. Mixtures of vinyl- or allyl-containing preceramic silazane polymers, mercapto

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compounds and photoinitiators are exposed to UV radiation and then pyrolyzed. The silazane polymers disclosed include low molecular weight monomers (columns 5-8). Lutz et al teach that the amount of photoinitiator “need only be sufficient to photoinitiate the system and will usually vary from 0.1 to 10 weight percent based on the weight of the preceramic silazane polymer” (column 8, lines 60-66).

The difference between the disclosure of Lutz et al and the instant claims is the recitation “no more than 0.02% by weight” of photoinitiator in claims 1 and 9. It would have been obvious to one skilled in the art at the time of the invention to use less than the usual amount of photoinitiator, such as 0.1 wt% based on the weight of the preceramic silazane polymer taught by Lutz et al, in the compositions disclosed by Lutz et al. The reason is that Lutz et al teach that the amount need only be sufficient to photoinitiate the system. One skilled in the art at the time of the invention would have been motivated by a reasonable expectation of photopolymerizing the disclosed thiol-ene compositions using a smaller amount of photoinitiator because it would not involve undue experimentation to determine the sufficient amount, especially considering that other factors such as distance from radiation source, time of irradiation, etc. also determine the success of photopolymerization.

Claims 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lutz et al (4,816,497) in view of Cramer et al in the article “Photopolymerization of Thiol-ene Polymers without Photoinitiators”. The disclosure of Lutz et al is discussed above. Lutz et al teach using a sufficient amount of photoinitiator to photoinitiate the system. Cramer et al teach that thiol-ene polymerizations can be photoinitiated without using a photoinitiator. It would have been obvious

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to one skilled in the art at the time of the invention to omit the photoinitiator from the compositions taught by Lutz et al in view of the teaching of Cramer et al that the thiol-ene compositions can be photoinitiated without the presence of a photoinitiator. One skilled in the art at the time of the invention would have been motivated by a reasonable expectation of would have been motivated by a reasonable expectation that the thiol-ene compositions disclosed by Lutz et al would be photopolymerized in the absence of a photoinitiator, as taught by Cramer et al.

Claims 20-21, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liew et al, in the article "Fabrication of SiCN MEMS by Photopolymerization of Pre-Ceramic Polymer" in view of Lutz et al '497. Liew et al disclose photolithographic patterning of a pre-ceramic polymer comprising adding and curing successive layers of liquid polymer followed by pyrolyzing the resulting polymer structures to form a multi-layered ceramic MEMS. The starting material is a liquid polysilazane precursor. Liew et al do not teach including a mercapto-functional compound in the precursor composition. Lutz et al teach mixtures of vinyl- or allyl-containing preceramic silazane polymers, mercapto compounds and photoinitiators that crosslink when exposed to UV radiation.

It would have been obvious to one skilled in the art at the time of the invention to employ the compositions taught by Lutz et al in the method of fabrication taught by Liew et al. Liew et al provide motivation by teaching liquid polysilazane precursors that are photopolymerizable in the presence of a photoinitiator are suitable in the disclosed method. Lutz et al provide motivation by teaching compositions comprising analogous preceramic silazanes and photoinitiators and that

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addition of mercapto compounds renders the compositions infusible prior to pyrolysis. One of ordinary skill at the time of the invention would have been motivated by a reasonable expectation of successfully obtaining useful SiCN MEMS by photopolymerization of a pre-ceramic precursor composition as taught by Lutz et al using the method taught by Liew et al.

Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liew et al, in the article "Fabrication of SiCN MEMS by Photopolymerization of Pre-Ceramic Polymer" in view of Lutz et al '497 and further in view of Cramer et al in the article "Photopolymerizations of Thiol-ene Polymers without Photoinitiators". The disclosures of Liew et al and Lutz et al are discussed above. Lutz et al teach using a sufficient amount of photoinitiator to photoinitiate the system. Cramer et al teach that thiol-ene polymerizations can be photoinitiated without using a photoinitiator. It would have been obvious to one skilled in the art at the time of the invention to omit the photoinitiator from the compositions taught by Lutz et al in view of the teaching of Cramer et al that the thiol-ene compositions can be photoinitiated without the presence of a photoinitiator. One skilled in the art at the time of the invention would have been motivated by a reasonable expectation of would have been motivated by a reasonable expectation that the thiol-ene compositions disclosed by Lutz et al would be photopolymerized in the absence of a photoinitiator, as taught by Cramer et al.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to /Susan W. Berman/ whose telephone number is 571 272 1067. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, James Seidleck can be reached on 571 272 1078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

SB
11/21/2007

/Susan W Berman/
Primary Examiner
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